

**IN THE CLAIMS**

Please amend claims 1 through 6, and add claims 7 and 8, as follows:

Sub E1  
1 (thrice amended). A memory system, comprising:

2 a plurality of defect-adaptive memory devices, each of said plurality of defect-  
3 adaptive memory devices having a first region [and a second region, said  
4 first region] for sequentially storing parity information [needed] for data  
5 recovery and [said] a second region for storing data;

6 a plurality of caches, each of said plurality of caches [being] respectively  
7 [connected] coupled operatively to a corresponding one of said plurality  
8 of defect-adaptive memory devices, each of said plurality of caches  
9 adapted for storing parity information [needed] for data recovery for a  
10 corresponding one of said plurality of defect-adaptive memory devices;  
11 and

12 a controller [connected] operatively coupled to each defect-adaptive memory  
13 device of said plurality of defect-adaptive memory devices and to each  
14 corresponding cache of said plurality of caches [that is respectively  
15 connected to a corresponding one of said plurality of defect-adaptive  
16 memory devices], said controller comprising a first means for selectively  
17 controlling writing and reading of parity information needed for data  
18 recovery in said first region of each corresponding one of said plurality  
19 of defect-adaptive memory devices, a second means for selectively

20 obtaining parity information needed for data recovery from said first  
21 region of each corresponding one of said plurality of defect-adaptive  
22 memory devices, and a third means for selectively storing parity  
23 information needed for data recovery obtained from said first region of  
24 a corresponding one of said plurality of defect-adaptive memory devices  
25 in a predetermined corresponding one of said plurality of caches.

Sub E1  
2 (thrice amended). The memory system of claim 1, [further comprised of]  
2 wherein said controller comprises a means for determining whether data recovery  
3 information is stored in any cache of said plurality of caches.

Sub E1  
3 (thrice amended). The memory system of claim 1, [further comprised of]  
2 wherein the parity information needed for data recovery [being] is stored and [being]  
3 is sequentially arranged from the most outer cylinder on a recording medium in each  
4 corresponding one of said plurality of defect-adaptive memory devices.

3  
4 (thrice amended). The memory system of claim 3, [further comprised of]  
2 wherein parity information [needed] for data recovery [being] is modified to a value  
3 obtained through a calculation of new data recovery information.

1 5 (thrice amended). The memory system of claim 4, [further comprised of]  
2 wherein parity information [needed] for data recovery [being] is obtained by

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3  
4 performing an exclusive-OR[ing of] operation on previous data, parity information corresponding to the previous data, and new data.

1 6 (thrice amended). A redundant array of inexpensive disks (RAID) system,  
2 comprising:

3 a plurality of disk drives, each of said plurality of disk drives including a first  
4 region having a plurality of data blocks for storing data and [another] a  
5 second region having a predetermined number of parity blocks for  
6 storing parity information [needed] for data recovery;

3  
7 a plurality of caches, each of said plurality of caches [being] respectively  
8 [connected] coupled operatively to a corresponding one of said plurality  
9 of disk drives, each of said caches adapted for storing parity information  
10 [needed] for data recovery; and

11 a controller [functionally connected] operatively coupled to each disk drive of  
12 said plurality of disk drives and to each corresponding cache of said  
13 plurality of caches, said controller adapted for selectively controlling a  
14 write operation of data and parity information [needed] for a data  
15 recovery in each corresponding disk drive of said plurality of disk  
16 drives, said controller comprising [by a process of]:

17 a first means for selecting [determining] a predetermined disk  
18 drive of said plurality of disk drives upon receipt of a data  
19 writing instruction from a host computer;

See  
E1

20 a second means for reading old data from the predetermined disk  
21 drive of said plurality of disk drives;

22 a third means for determining whether old parity information  
23 corresponding to the old data corresponding to the  
24 predetermined disk drive of said plurality of disk drives is  
25 accessed in a corresponding cache of said plurality of  
26 caches;

27 [upon the old parity information corresponding to the  
28 predetermined disk drive of said plurality of disk drives not  
29 being accessed in the corresponding cache of said plurality  
30 of caches,] a fourth means for reading the old parity  
31 information from the predetermined disk drive of said  
32 plurality of disk drives, upon the old parity information  
33 corresponding to the predetermined disk drive of said  
34 plurality of disk drives not being accessed in the  
35 corresponding cache of said plurality of caches, and for  
36 then loading the corresponding cache of said plurality of  
37 caches with the old parity information;[, and then said  
38 controller performing the following process:]

39 a fifth means for obtaining new parity information by performing  
40 an exclusive OR operation on the old data, the old parity  
41 information and new data;

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42 a sixth means for loading the corresponding cache of said  
 43 plurality of caches with the new parity information; [and]  
 44 a seventh means for writing the new data in said region for  
 45 storing data in the predetermined disk drive of said  
 46 plurality of disk drives and writing the new parity  
 47 information in said another region for storing parity  
 48 information in the predetermined disk drive of said  
 49 plurality of disk drives; and  
 50 an eighth means for reading old parity information from the  
 51 predetermined disk drive, in the event that no old parity  
 52 information exists in a corresponding cache, and for then  
 53 moving said old parity information read from the  
 54 predetermined disk drive to the corresponding cache to  
 55 provide an update of the parity information.

cy 2 --7. In a method of writing data to, and reading data from, a redundant array  
 3 of inexpensive disks (RAID) system, said method comprising steps for sequentially  
 4 storing information for data recovery in a first region of a disk, storing information  
 5 comprising data in a second region of the disk other than the first region, controlling  
 6 writing and reading of information by means of an electronic controller unit, and  
 7 caching information for data recovery, *the improvement comprising* a step for  
 reducing overhead during a read operation for data recovery and thereby improving

*Sub  
E1*  
data input-output performance.

1           --8. The method of claim 7, wherein said step for reducing overhead during a  
2 read operation for data recovery and thereby improving data input-output  
3 performance comprises steps for:

*Cy*  
4           (a) coupling each one of a plurality of caches to each corresponding one of a  
5 plurality of disks, whereby each disk is coupled to one cache;

6           (b) operatively coupling the caches to the controller;

7           (c) storing in each one of the plurality of caches information for data recovery  
8 in the disk corresponding to the cache; and

9           (d) determining information for data recovery in a disk by using information  
10 for data recovery stored in the cache corresponding to the disk.

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